U.S. Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

03-OSR-0072

Mr. R. F. Naventi, Project Manager
Bechtel National, Inc.
2435 Stevens Center
Richland, Washington 99352

Dear Mr. Naventi:

CONTRACT NO. DE-AC27-01RV14136 - CONDITIONAL APPROVAL OF AUTHORIZATION BASIS AMENDMENT REQUEST (ABAR) 24590-WTP-ABAR-ENS-03-008, REVISION 0, TO THE SAFETY REQUIREMENTS DOCUMENT (SRD)

Reference: BNI letter from R. F. Naventi to R. J. Schepens, ORP, "Transmittal for Approval: Authorization Basis Amendment Request 24590-WTP-ABAR-ENS-03-008, Revision 0, Modification of SRD Criterion 4.5-4 to Allow Omission of Automatic Fire Suppression Systems from High Radiation Areas," CCN-051753, dated February 13, 2003.

This letter conditionally approves the subject ABAR. Bechtel National, Inc. (BNI) must tailor implementing code and standard DOE O 420.1A to conform with revised Safety Criterion 4.5-4 when this ABAR is implemented. BNI provided the subject ABAR to ORP on February 13, 2003 (Reference). The ABAR proposed to modify SRD Safety Criterion 4.5-4 to allow the omission of automatic fire extinguishing systems in specified High Level Waste building high radiation areas that contain low combustible loadings.

Based on the information in the Reference and the attached Safety Evaluation Report, the changes are acceptable and comply with applicable laws, regulations, and River Protection Project Waste Treatment and Immobilization Plant contractual requirements. There is reasonable assurance that the health and safety of the public, the workers, and the environment will not be adversely affected by these changes.

BNI is requested to submit within 14 days of receipt of this letter the revised pages of the SRD identifying all revisions to date. This amendment is effective immediately and shall be fully implemented within 30 days. Controlled copies of the SRD and subordinate documents must be modified to reflect the changes associated with this amendment.

If you have any questions, please contact me, or your staff may call Lewis F. Miller, Jr., WTP Safety Regulatory Division, (509) 376-6817.

Sincerely,

Roy J. Schepens
Manager

OSR:RWG

Attachment

**Safety Evaluation Report (SER)
of Proposed Authorization Basis Amendment Request (ABAR)
24590-WTP-ABAR-ENS-03-008, Rev. 0
to the Safety Requirements Document (SRD)
for the River Protection Project Waste Treatment and Immobilization Plant (WTP)**

1.0 INTRODUCTION

The WTP authorization basis is the composite of information provided by a Contractor in response to radiological, nuclear, and process safety requirements that is the basis on which the U.S. Department of Energy (DOE), Office of River Protection (ORP) grants permission to perform regulated activities. The authorization basis for the WTP includes the SRD that contains the approved set of radiological, nuclear, and process safety standards and requirements, which if implemented, provide adequate protection of workers, the public, and the environment against the hazards associated with the operation of the facility.

By letter dated February 13, 2003,[1] Bechtel National, Inc. (the Contractor) submitted a proposed amendment to the SRD in the area of fire protection safety criteria for automatic fire suppression systems. The amendment proposes to change SRD Safety Criterion 4.5-4. SRD Safety Criterion 4.5-4 currently states:

> "Automatic fire extinguishing systems shall be included in all areas subject to loss of Safety Design Class systems, significant life safety hazards, or unacceptable program interruption, unless DOE approval of an alternate form of protection for those areas has been obtained.
>
> As determined by the Fire Hazards Analysis special hazards shall be provided with additional fixed protection systems."

The proposed amendment would change this Safety Criterion to read:

> "Automatic fire extinguishing systems shall be included in all areas subject to loss of Safety Design Class systems, significant life safety hazards, or unacceptable program interruption, unless DOE approval of an alternate form of protection for those areas has been obtained.
>
> In meeting the requirements for fully sprinklered facilities, automatic fire extinguishing systems are not required in the High Level Waste (HLW) building's high radiation areas containing low combustible loading as identified in Appendix #.
>
> As determined by the Fire Hazards Analysis special hazards shall be provided with additional fixed protection systems."

[1] BNI letter from R. F. Naventi to R. J. Schepens, ORP, "Transmittal for Approval: Authorization Basis Amendment Request 24590-WTP-ABAR-ESH-03-008, Revision 0, '*Modification of SRD Criterion 4.5-4 to Allow Omission of Automatic Fire Suppression Systems from High Radiation Areas*'," CCN: 051753, dated February 13, 2003.

The proposed changes allow the Contractor to construct some areas within the HLW facility without automatic fire suppression systems. The specific areas are identified in proposed Appendix # of the SRD as follows:

Appendix #
List of HLW Facility Areas Not Requiring Automatic Fire Suppression Systems Based on High Radiation and Low Combustible Loading

HLW Area	Description	PFHA* Combustible Loading**
H-136	Canister Handling Cave	Very Low
H-B015	Drum Transfer Tunnel	Very Low
H-B035	Canister Decon Cave	Low
H-B014	Wet Process Cell	Very Low
H-B032	Pour Tunnel No. 1	Very Low
H-B005A	Pour Tunnel No. 2	Very Low
H-B021	SBS Drain Collection Cell No. 1	Very Low
H-B005	SBS Drain Collection Cell No. 2	Very Low
H-B013	Active Pipeway to/from Pretreatment	Very Low

* Preliminary Fire Hazards Analysis

** "Very Low" means an average combustible load, CL<20,000 BTU/ft^2, with isolated concentrations $\leq$ 40,000 BTU/ft^2

"Low" means an average combustible load, 20,000 BTU/ft^2 $\leq$ CL $\leq$ 80,000 BTU/ft^2, with isolated concentrations $\leq$ 160,000 BTU/ft^2

2.0 BACKGROUND

Contract No. DE-AC27-01RV14136,[2] Standard 7, item d requires the Contractor to conduct work in accordance with the Contractor developed and DOE approved SRD. Standard 7, item e(1)(i) of the Contract requires the Contractor to develop and implement an integrated standards-based safety management (ISM) program. Standard 7, item e(2)(ii) of the Contract requires the Contractor's ISM program to comply with the regulatory program established in DOE/RL-96-0004, *Process for Establishing a Set of Radiological, Nuclear, and Process Safety Standards and Requirements for the RPP Waste Treatment Plant Contractor*. Finally, Standard 7, item e(2)(iii) of the Contract requires the Contractor's ISM Plan to conform to RL/REG-97-13, *Regulatory Unit Position on Contractor-Initiated Changes to the Authorization Basis*.[3]

Section 4.5 of the SRD contains the fire protection safety criteria for the WTP. Each safety criterion identifies associated implementing codes and standards. SRD Safety Criterion 4.5-4 provides the requirements for automatic fire extinguishing systems. Specifically, SRD Safety Criterion 4.5-4 requires automatic fire extinguishing systems to be included in all areas subject to loss of Safety Design Class systems, significant life safety hazards, or unacceptable program

[2] Contract No. DE-AC27-01RV14136, between the U.S. Department of Energy and Bechtel National, Inc., dated December 11, 2000.
[3] RL/REG-97-13, *Regulatory Unit Position on Contractor-Initiated Changes to the Authorization Basis*, Rev. 9, dated September 2002.

interruption, unless DOE approval of an alternate form of protection for those areas has been obtained. The Contractor has determined through application of their ISM process, consistent with DOE/RL-96-0004 and as documented in the HLW Preliminary Safety Analysis Report (PSAR) and PFHA, that safety and technical bases exist to exclude certain areas within the HLW building from the requirements for automatic fire extinguishing systems. As such, consistent with RL/REG-97-13, the Contractor submitted 24590-WTP-ABAR-ENS-03-008 proposing to modify SRD Safety Criterion 4.5-4 to allow omission of automatic fire suppression from specified high radiation areas of the HLW Building containing low combustible loadings.

3.0 EVALUATION

3.1 Proposed Changes to SRD Safety Criterion 4.5-4:

SRD Safety Criterion 4.5-4 currently states:

> "Automatic fire extinguishing systems shall be included in all areas subject to loss of Safety Design Class systems, significant life safety hazards, or unacceptable program interruption, unless DOE approval of an alternate form of protection for those areas has been obtained.
>
> As determined by the Fire Hazards Analysis special hazards shall be provided with additional fixed protection systems."

The proposed amendment would change this Safety Criterion to read:

> "Automatic fire extinguishing systems shall be included in all areas subject to loss of Safety Design Class systems, significant life safety hazards, or unacceptable program interruption, unless DOE approval of an alternate form of protection for those areas has been obtained.
>
> In meeting the requirements for fully sprinklered facilities, automatic fire extinguishing systems are not required in the High Level Waste building's high radiation areas containing low combustible loading as identified in Appendix #.
>
> As determined by the Fire Hazards Analysis special hazards shall be provided with additional fixed protection systems."

The proposed changes allow the Contractor to construct some areas within the HLW facility without automatic fire suppression systems. The specific areas are identified in proposed Appendix # of the SRD as follows:

Appendix #
List of HLW Facility Areas Not Requiring Automatic Fire Suppression Systems Based on High Radiation and Low Combustible Loading

HLW Area	Description	PFHA Combustible Loading*
H-136	Canister Handling Cave	Very Low
H-B015	Drum Transfer Tunnel	Very Low
H-B035	Canister Decon Cave	Low
H-B014	Wet Process Cell	Very Low
H-B032	Pour Tunnel No. 1	Very Low
H-B005A	Pour Tunnel No. 2	Very Low
H-B021	SBS Drain Collection Cell No. 1	Very Low
H-B005	SBS Drain Collection Cell No. 2	Very Low
H-B013	Active Pipeway to/from Pretreatment	Very Low

* "Very Low" means an average combustible load, CL<20,000 BTU/ft^2, with isolated concentrations $\leq$ 40,000 BTU/ft^2
"Low" means an average combustible load, 20,000 BTU/ft^2 $\leq$ CL $\leq$ 80,000 BTU/ft^2, with isolated concentrations $\leq$ 160,000 BTU/ft^2

Evaluation (acceptable): The reviewers evaluated the HLW building areas identified in the proposed SRD Appendix # table above against the safety basis descriptions identified in the HLW PSAR and HLW PFHA. The table below identifies the Fire Areas identified in the HLW PFHA for each of the HLW building areas and HLW PFHA areas.

ABAR HLW Area (PFHA HLW Area)	Description	PFHA Fire Area
H-136 (H-146)	Canister Handling Cave	HV008
H-B015 (H-B015)	Drum Transfer Tunnel	HV008
H-B035 (H-B035)	Canister Decon Cave	HV008
H-B014 (H-B014)	Wet Process Cell	HV008
H-B032 (H-B019A)	Pour Tunnel No. 1	HV008
H-B005A (H-B005A)	Pour Tunnel No. 2	HV102
H-B021 (H-B021)	SBS Drain Collection Cell No. 1	HV008
H-B005 (H-B004)	SBS Drain Collection Cell No. 2	HV102
H-B013 (H-B013)	Active Pipeway to/from Pretreatment	HV008

The evaluation of the amount of combustibles in each HLW building area identified in the proposed SRD Appendix # table are summarized in the following table.

HLW Area	Description
H-136	The Canister Handling Cave includes an overhead crane, standby crane, crane cable reels, grapple, buffer/cooling racks, and master slave manipulators. Fixed combustibles in this area are limited to small amounts of lubricants in sealed locations (e.g., cranes bridge gear-box and hoist motor bearing housings), cables in conduit, a single run of cable with combustible insulation powering the crane, small lengths of bare cable at terminations, and the epoxy

	coating (special protective coating) applied to walls, ceiling, and floor, as applicable. This area is normally inaccessible with no potential for transient combustibles. As such, the reviewers found the characterization of this area as having very low combustibles to be acceptable.
H-B015	The Drum Transfer Tunnel includes a motor-driven bogie to transport empty and filled waste drums to and from locations under the melter cave or the filter cave. Fixed combustibles in this area are limited to the cable reeling system combustible insulation powering the bogie, the bogie motor, very low amounts of combustibles (e.g., dust on expended HEPA filters, etc.) in the drums that have attached crimped lids, and the epoxy coating (special protective coating) applied to walls, ceiling, and floor, as applicable. This area is normally inaccessible with no potential for transient combustibles. As such, the reviewers found the characterization of this area as having very low combustibles to be acceptable.
H-B035	The Canister Decon Cave contains a canister decontamination vessel (V33001), a waste neutralization vessel (V33002), and a sump with steam jet ejectors and level indication. Fixed combustibles in this area are limited to small lengths of bare cable at terminations and the epoxy coating (special protective coating) applied to walls, ceiling, and floor, as applicable. This area is normally inaccessible with no potential for transient combustibles. As such, the reviewers found the characterization of this area as having low combustibles to be acceptable.
H-B014	The Wet Process Cell contains the HLW concentrate receipt vessels (2), acidic waste storage vessel, plant wash and drains vessel, decontamination effluent collection vessel, the offgas drains collection vessel, and a sump with steam jet ejectors and level indication. Vessels contain fluidic mixers, pumps, and samplers; level, density, pressure, and temperature measurement instrumentation; cooling water jackets, and internal wash rings and emptying ejectors. Fixed combustibles in this area are limited to cables in conduit, small lengths of bare cable at terminations, and the epoxy coating (special protective coating) applied to walls, ceiling, and floor, as applicable. This area is normally inaccessible with no potential for transient combustibles. As such, the reviewers found the characterization of this area as having very low combustibles to be acceptable.
H-B032	Pour Tunnel No. 1 contains a chain-driven bogie to transport empty and filled canisters, bogie decontamination equipment, canister lidding station, and glass catch trays. Fixed combustibles in this area are limited to cables in conduit, small lengths of bare cable at terminations, a small amount of lubrication on the bogie drive chain, and the epoxy coating (special protective coating) applied to walls, ceiling, and floor, as applicable. This area is normally inaccessible with no potential for transient combustibles. As such, the reviewers found the characterization of this area as having very low combustibles to be acceptable.
H-B005A	Pour Tunnel No. 2. This area is similar to area H-B032 above. For the same reasons, the reviewers found the characterization of this area as having very low combustibles to be acceptable.
H-B021	SBS Drain Collection Cell No. 1 contains the SBS condensate receipt vessel (V32101) and a sump with steam jet ejectors and level indication. Fixed combustibles in this area are limited to cables in conduit, small lengths of bare cable at terminations, and the epoxy coating (special protective coating) applied to walls, ceiling, and floor, as applicable. This area is normally

	inaccessible with no potential for transient combustibles. As such, the reviewers found the characterization of this area as having very low combustibles to be acceptable.
H-B005	SBS Drain Collection Cell No. 2. This area is similar to area H-B021 above. For the same reasons, the reviewers found the characterization of this area as having very low combustibles to be acceptable.
H-B013	The Active Pipeway to/from Pretreatment contains no known combustibles beyond the epoxy coating (special protective coating) applied to walls, ceiling, and floor, as applicable. This area is normally inaccessible with no potential for transient combustibles. As such, the reviewers found the characterization of this area as having very low combustibles to be acceptable.

The HLW PSAR, Section 3.4.1.9 summarizes the analysis of three representative fire events in the HLW facility. These include a fire affecting the melter offgas fans, a fire affecting a canister crane, and a fire affecting a drum cask in the truck bay. The fire affecting a canister crane involves failure of the standby crane in the Canister Storage Cave during the movement of a loaded canister to the Cask Handling Tunnel. None of the fire events analyzed in the HLW PSAR involve HLW building areas addressed by the changes proposed by 24590-WTP-ABAR-ENS-03-008. In addition, none of the design basis fire event scenarios analyzed in the HLW PFHA resulted from fires initiated in the HLW building areas addressed by the changes proposed by 24590-WTP-ABAR-ENS-03-008. As such, 24590-WTP-ABAR-ENS-03-008 has no impact on the safety basis or safety conclusions presented in the HLW PSAR and HLW PFHA.

ABAR 24590-WTP-ABAR-ENS-03-008 concludes that fires in any of the HLW building areas addressed by the changes proposed by the ABAR would be small and contained close to the point of origin with minimal radiological consequences. The ABAR further concludes that automatic fire extinguishing systems are not needed in these areas for the HLW building to achieve or maintain a safe state condition for postulated fire events. The reviewers determined these conclusions to be acceptable because they were supported by the analyses documented in the HLW PFHA that reached the same conclusions. Further, the reviewers agreed with the statements in 24590-WTP-ABAR-ENS-03-008 that inclusion of automatic fire extinguishing systems in these HLW areas would create the potential for the spread of contamination within HLW areas and the need to dispose of the contaminated fire water without an offsetting safety improvement. In addition, maintenance, testing, and inspection of fire extinguishing equipment installed in these HLW building area, including restoration of the automatic fire extinguishing system to operable status following in-cell equipment failures, would not be practical.

The automatic fire extinguishing systems planned for installation in many HLW areas are not credited by the HLW PSAR or HLW PFHA for ensuring that important-to-safety (ITS) systems, structures, and equipment (SSCs) are capable of performing their safety functions during or after a postulated fire event. The HLW PFHA analyzed a design basis event scenario(s) for each fire area assuming that installed automatic fire extinguishing systems, if any, are inoperable. The HLW PFHA concluded that a fire in the fire areas, including those areas addressed by the changes proposed by 24590-WTP-ABAR-ENS-03-008, will not impact the ability of the facility to achieve or maintain safe state. In addition, the PFHA concludes that a fire will not release radioactive materials or process chemicals in excess of regulatory limits. DOE previously agreed with these conclusions as documented in the SER for HLW facility full construction

authorization, ORP/OSR-2002-18, *Safety Evaluation Report for Waste Treatment and Immobilization Plant (WTP) Construction Authorization*.[4] The reviewers determined these conclusions remain valid for the changes proposed by 24590-WTP-ABAR-ENS-03-008.

In addition, the reviewers determined that the changes proposed by 24590-WTP-ABAR-ENS-03-008 are not in conflict with the requirements of SRD Safety Criterion 4.5-4 implementing codes and standards (NFPA Standard 801, DOE-STD-1066, and DOE O 420.1A), with one exception. NFPA Standard 801, *Facilities Handling Radioactive Materials*, requires fire suppression systems and equipment in all areas of a facility as determined by the fire hazards analysis. As noted above, the HLW PFHA results were based on the assumption that the HLW building areas addressed by the changes proposed by 24590-WTP-ABAR-ENS-03-008 would not include automatic fire extinguishing systems and were found to be acceptable by DOE. DOE-STD-1066 requirements for automatic fire extinguishing systems are not impacted by the changes proposed by ABAR 24590-WTP-ABAR-ENS-03-008. However, DOE O 420.1A, Section 4.2.2.3 requires automatic fire extinguishing systems throughout all significant facilities and in all areas subject to loss of safety class systems, significant life safety hazards, unacceptable program interruption, or fire loss potential in excess of defined limits. The reviewers determined that, as a Condition of Approval for ABAR 24590-WTP-ABAR-ENS-03-008, the Contractor must tailor the automatic fire extinguishing system requirements of DOE O 420.1A in Appendix C of the SRD to be consistent with the changes to SRD Safety Criterion 4.5-4 approved by this SER. The revised SRD pages are to be submitted to ORP within 14 days of receipt of this SER. (This condition was discussed and agreed to with Contractor representatives.)

Finally, the reviewers determined that the conclusions of the SER for HLW facility full construction authorization (ORP/OSR-2002-18) were not impacted by the changes proposed by 24590-WTP-ABAR-ENS-03-008. ORP/OSR-2002-18, Section 3.18.2.4 identified, based upon the reviewers' evaluation of 24590-WTP-RPT-AR-02-001, "Performance-Based UBC Type II, F.R. Equivalency for the LAW, HLW, and Pretreatment Facility Buildings," automatic sprinkler systems would be used extensively throughout the process buildings, except for potentially contaminated, inaccessible (C5/R5) areas in which no surveillance, testing, or maintenance of fire protection systems could be performed. In addition, ORP/OSR-2002-18, Section 6.3.2.3(g) stated that during HLW facility construction, the Contractor must retain the option to design and install automatic fire suppression for potentially contaminated, inaccessible (C5/R5) areas in which no surveillance, testing, or maintenance of fire protection systems could be performed. ORP/OSR-2002-18 also stated that the Contractor was not authorized to construct SSCs that implement control strategies that were inconsistent with meeting the existing SRD requirements. This SER satisfies that proviso for the HLW areas addressed by Attachment # of the SRD changes proposed by 24590-WTP-ABAR-ENS-03-008.

[4] ORP/OSR-2002-18, *Safety Evaluation Report for Waste Treatment and Immobilization Plant (WTP) Construction Authorization*, Revision 2, dated November 13, 2002.

4.0 CONCLUSION

On the basis of the considerations described above, ORP has concluded there is reasonable assurance that the health and safety of the public, the workers, and the environment will not be adversely affected by the proposed changes proposed by 24590-WTP-ABAR-ENS-03-008. The proposed changes to SRD Safety Criterion 4.5-4 do not constitute a significant reduction in commitment or effectiveness relative to the fire protection design, construction, and operation of the HLW building. Accordingly, the proposed changes are acceptable and ORP approves the amendments as proposed in 24590-WTP-ABAR-ENS-03-008, Revision 0, subject to the condition that implementing code and standard DOE 0 420.1A be tailored to conform with Safety Criterion 4.5-4 when this change is implemented. However, a key basis for this acceptance is the accuracy of the combustible loading information documented in the HLW PHFA which establishes the basis for facility fire safety. Should design evolution result in challenges to the combustible loading information documented in the PFHA, the Contractor is expected to verify that the PFHA conclusions remain valid or implement additional controls to ensure adequate facility fire safety is maintained.